

REFERENCES

- CHACKO, P. I., ABRAHAM, J. G. & ANDAL, R. (1953): Report on a survey of the flora, fauna and fisheries of the Pulicat lake, Madras State, India, 1951-52. *Cont. Freshwater Fish. Biol. Stat., Madras* 8:1-20.
- GEORGE, M. J. (1964): On the occurrence of *Metapenaeus burkenroadi* Kubo (Family Penaeidae, Crustacea, Decapoda) in Indian waters. *J. mar. biol. Ass. India* 6(2):313-314.
- MOSES, S. T. (1923): A statistical account of the fish supply of Madras. *Madras Fish. Bull.* 15:131-166.
- SUBRAHMANYAM, M. (1966): New records of prawns from the Chilka lake with notes on their distribution. *Sci. Cult.* 32(7):379-380.

21. BEHAVIOUR DURING ECDYSIS AND THE MODE OF ECLOSION FROM EGG IN *LOBELLA* (*PROPEANURA*) *CORALLINA* (IMMS, 1912) (*COLLEMBOLA*: NEANURIDAE)

There is no information available in literature on the moulting behaviour and the mode of eclosion from eggs for any species of *Lobella*. What little is known mostly concerns other genera of Neanuridae.

MATERIAL AND METHOD

The species is common in and around Dehra Dun, Uttar Pradesh and the examples studied from various localities agree with the original description and the redescription given by Yosii (1966), in all details, except in the median tooth of the mandible which is little exaggerated than what was depicted by Yosii (loc. cit.) from Ceylonese examples.

In the second week of July, 1965, an attempt was made to set up a culture with five specimens (1 ♀ and 4 ♂) in a pair of petridish with some semi-humified leaf-litter, brought from the locality where the specimens were collected (Sahasradhara Hills, Yamuna Forest Division, Dehra Dun, U.P.). Moist filter papers were placed on the floor of the rearing petridish and on the inner surface of the cover to maintain requisite moisture in the culture. Pieces of bread, soaked in water, were used as food for the species.

BIOLOGY

The species in nature is found underneath decaying leaf-litter, saturated with moisture. It is bright coral-red in colour and is usually sluggish in habit and when disturbed shows a tendency to go deeper into the litter. Females are conspicuously larger than the males and in any

population the males outnumber the females. They are mostly saprophagous and thrive on the juices of humid litter. When any portion of the body is touched, the insect reacts by falling on its side and twisting its abdomen and regains its normal posture the next moment.

PRE- AND POST-MOULTING BEHAVIOUR

Collembolans undergo ecdysis often in their life. Just on the eve of ecdysis, the individual becomes passive and rarely moves even when disturbed. It usually rests on the ground supporting itself on its antennae with the head depressed on the ground and the body parallel to the ground. The colour fades. After about 6-7 hours, a movement of alternate contraction and relaxation both antero-posteriorly and dorso-ventrally starts at the thorax and a wave of contraction and relaxation, elevation and depression engulfs the entire body in quick succession. At last the skin ruptures at the right side near the junction of head and thorax and the insect emerges out of the skin by first extricating its head and thorax from the ruptured cuticle. Later on, it frees its legs from the skin and with the help of antennae and legs the whole insect comes out.

Post-moulting behaviour of the insect varies and can be summarised as follows: In general, all individuals after moulting contract, relax and sometimes curl the body and sometimes lie on their back with the legs showing no movement. The insects, start normal locomotion after 15 minutes. Just after ecdysis, they look pale and regain the deep coral-red colour after 2-3 minutes. The species moults at an interval of 6-7 days.

OVIPOSITION AND MODE OF ECLOSION

The female, in the culture, laid two batches of eggs on the fifth day after the establishment of the culture. The larger batch consisted of 34 eggs and the smaller one 7 eggs, some of the eggs of this batch were distinctly smaller than others. The majority of the eggs were oval in shape and brownish-white in colour and measured from 0.12 to 0.25 mm on their widest aspect. The surface of the eggs was smooth and glistening and no processes could be seen even under high magnification. The eggs gradually became dark brown in colour as the embryo developed. On the fifth day of oviposition, eclosion of 1st instar nymphs took place from all the seven eggs of the smaller batch. On the same day, movement of the nymphs inside the eggs of the larger batch was seen through the thin chorion of the eggs. The eggs from which eclosion was imminent could be marked by their deep brown coloration. Eclosion from

the larger batch started also on the fifth day of oviposition and continued upto ninth day.

Mode of eclosion: The region of egg from where the eclosion of the nymph would take place depends on the position of the egg in that batch. Eclosion usually took place from the exposed surface and never from the surface which remained overlapped by other eggs. During eclosion, a slit approached at one of the poles (free pole in case of an overlapped egg) apparently owing to vigorous movement of the nymph inside. As the slit widened gradually, the nymph made its appearance first by protruding the tip of its abdomen outside. With the support of its legs on the inner floor of the egg the nymph pushed itself out more and more. As soon as the hind legs came out, it took their support of the adjacent eggs to extricate itself completely. Newly emerged nymphs were very active and fed vigorously.

Appearance of first instar nymph: Newly hatched nymphs were white in colour with reddish suffusion and changed to pale brown within half an hour after their emergence. The ocellar fields were seen to be the darkest with granular reddish pigment but the ocelli were not very prominent. Although the lateral bosses were perceptible, no trace of dorsolateral bosses could be noticed. The nymphs measured c. 0.05 mm in length with the labium protruded anteriorly. On the seventh day of the eclosion, rudiments of bosses were visible on the dorsolateral surface of body and the ocelli became conspicuous in the form of elevated domes.

ACKNOWLEDGEMENTS

I am grateful to the Director, Zoological Survey of India and to the Officer-in-Charge, Northern Regional Station, Dehra Dun, for providing necessary facilities.

ZOOLOGICAL SURVEY OF INDIA,
34, CHITTARANJAN AVENUE,
CALCUTTA 700 012,
July 21, 1973.

S. K. MITRA

22. BUTTERFLIES OF NEW DELHI (PAPILIONOIDEA)

I would like to make a few comments on Roger Ashton's paper under the above title (1972, *J. Bombay nat. Hist. Soc.* 69:502-509).

Danaus chrysippus (L.)—It is a great pity that advantage was not taken of the capture of a female f. *dorippus* Klug to try to work out the genetics of this form. On the Kenya Coast, where *dorippus* is the prevalent form, it is dominant to *chrysippus*, and it would have been